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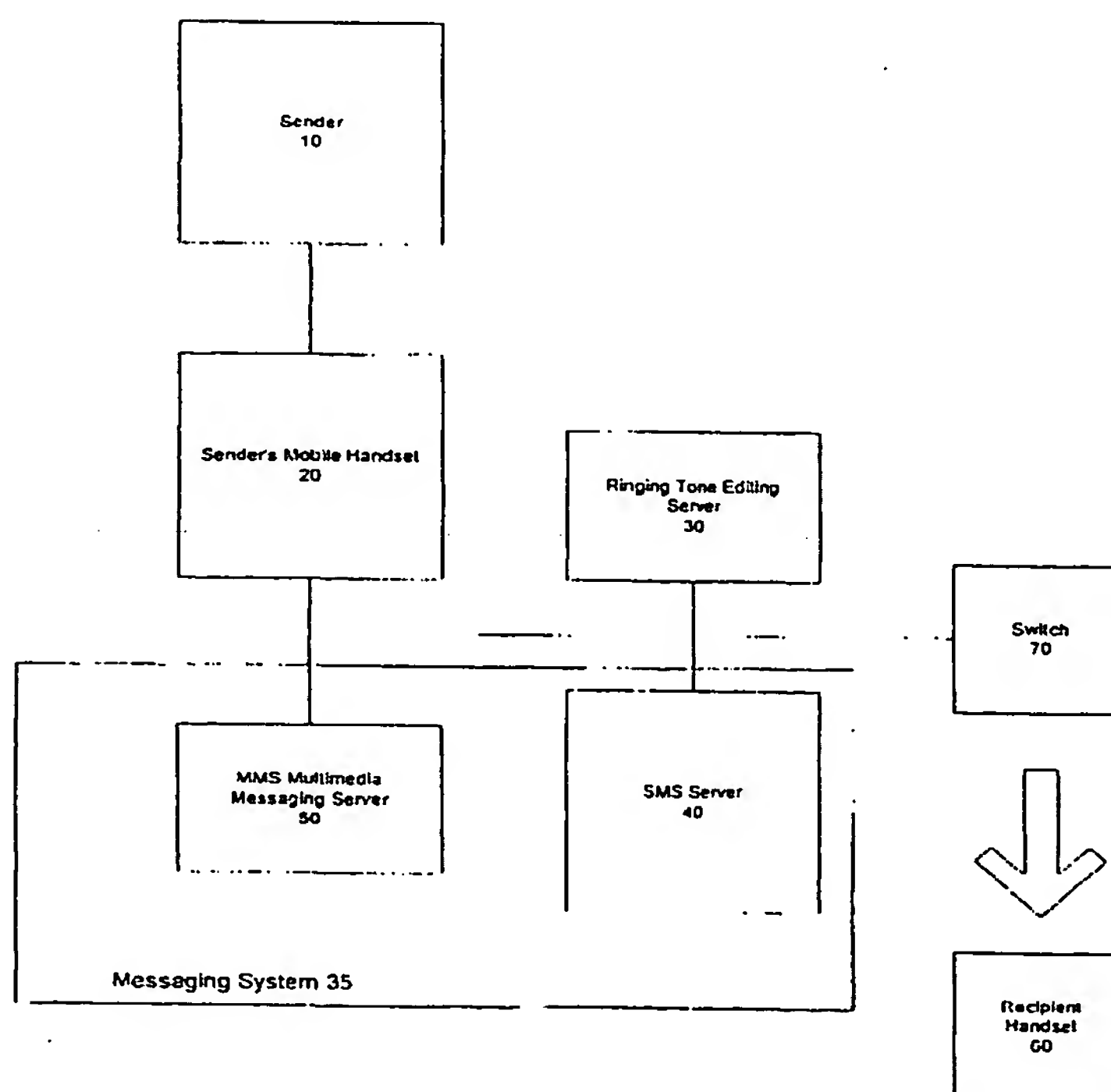
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(54) **Generating a distinctive ring tone for a calling party**

(57) A system and method of message indicating that enable the sender of a message to chose the ringing tone of the receiver's cellular telephone upon arrival of the sender's message. The sender (10) has the ability to either choose or create the ringing tone to be played

on the receiver's cellular telephone (60). The sender also has the ability to create either SMS or multimedia messages to be sent with the ringing tone. The ringing tones may also be chosen or downloaded from Internet sites.

Figure 1



Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001] The present invention relates generally to a multimedia messaging service ("MMS") application and more specifically to using a multimedia messaging service based application to personalize the ring tone of a receiver's telephone to indicate the presence of a message.

2. Description of Related Art

[0002] Multimedia messaging service provides the ability to send and receive messages comprising a combination of text, sounds, images and video to Multimedia Service capable handsets and computers. MMS is a component that can be connected to all possible networks such as cellular networks, broadband networks, fixed line and Internet networks. As technology has evolved so has the needs of its senders. Senders, such as cellular telephone senders, demand more out of their messaging service. They require the ability to send and received such items as business cards, post cards and pictures.

[0003] Accordingly, MMS was developed to provide enhanced messaging, based on the senders' new demands. In the 3G cellular (3rd generation of cellular communication specifications) architecture, MMS has been added. As stated above, this allows senders of cellular telephones to send and receive messages exploiting a whole array of media types while also making it possible to support new content types as they become popular. MMS is well known in the art and has been standardized in the telecommunication world (see standard 23.140, of release 2000 of the 3GPP-3G Partnership Project as it appears in European Telecommunications Standards Institute (incorporated herein by reference). For current standards see ETSI at 650, route des Lucioles, 06921 Sophia Antipolis, France, Telephone No. +33 4 92 94 42 00, Fax +33 4 93 65 47 16, secretariat@etsi.fr).

[0004] Mobile Originated Short Messaging Service ("MO-SMS") is a messaging service that allows a cellular telephone sender (the "sender") to send text messages to another cellular telephone sender (the "receiver"). When the sender sends a message to the receiver, the receiver's cellular telephone indicates that a message has arrived by using the ringing tone set by the receiver. Said differently, the receiver chooses to set the ringer on his cellular telephone to a particular ringing tone which in turn is played every time any message is received regardless of who sent the message.

[0005] Today, most mobile telephone senders can select a ring tone from several ring tones that come with their cellular telephones, i.e. ring tones that are predefined by the mobile telephones' manufactures. Ring

tones can also be downloaded from various sources, such as the Internet, into many mobile telephones. Additionally, both some mobile telephones allow senders to edit their own ringing tone by specifying the musical notes or tones to be played.

[0006] The SMS standard as it exists today transfers the message to the receiver's cellular telephone, but it does not enable automatic instant play of the messages (i.e. each message is not played immediately upon receipt by the mobile telephone). This means that the sender may send a personal tone as part of an SMS message (e.g. the letters chosen by the sender represent musical tones, for example the letter C represents the musical tone "Do", D represents "Re" and E represent "Me"...The handset converts the letters to musical notes and plays the corresponding musical notes.), but the personal tone will not cause the receiver's cellular telephone to ring automatically using the sender's personal ringing tone. Rather, the receiver is only able to hear the sender's personal tone after the message is played. In other words, the sender's personal ringing tone is not the ringing tone that is played by the receiver's cellular telephone to indicate the arrival of the sender's message.

SUMMARY OF THE INVENTION

[0007] The present invention solves the problems and shortcomings attendant with known messaging services by providing a messaging application that gives a sender the ability to send a personalized ringing tone that will cause a receiver's cellular telephone to ring using the sender's personalized ringing tone upon arrival of the sender's message. Further, the invention provides a messaging application that allows a mobile telephone to play a sender's personalized ringing tone upon the arrival of the sender's message. Said differently, the sent message contains two parts. The first part is the sender's personalized ringing tone while the second part is that actual text that the sender wants the receiver to read.

[0008] The present invention further solves the above-described problems and limitations by enabling sender to choose the ringing tone that will ring when his message arrives at the receiver's cellular telephone. This allows the receiver to know instantly whom the message is from simply by hearing the ringing tone of his cellular telephone.

[0009] In a preferred embodiment of the present invention, a sender enters a messaging service using the sender's cellular telephone. The sender then chooses to use an already created ringing tone from an MMS server or to edit his own ringing tone by using a ringing tone editing server. Then, the sender creates his message using either a regular SMS message server or an MMS message server. The message is then sent to a receiver and the sender's chosen ringing tone serves as an automatic play-SMS message and the content of the

message the sender has created is sent as a regular SMS or as a multimedia message. The receiver will automatically hear the sender's indicating ringing tone, and can choose whether to read the received message.

[0010] In another embodiment of the present invention, the sender uses a personal computer or a fixed telephone to gain access to the messaging servers.

[0011] In yet another embodiment of the present invention, the sender chooses or downloads a ringing tone from an Internet source.

[0012] Further objects, features and advantages of the invention will become apparent from a consideration of the following description and the appended claims when taken in connection with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0013] The above aspects of the present invention will become more apparent by describing in detail embodiments thereof with reference to the attached drawings, in which:

Figure 1 is a block diagram illustrating the interrelationships between the components of the personalized indicating ringing tone system of the present invention; and

Figures 2(a) and 2(b) show a flow chart of the process of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0014] Hereinafter, embodiments of the present invention will be described in detail with reference to the attached drawings. The present invention is not restricted to the following embodiments, and many variations are possible within the spirit and scope of the present invention. The embodiments are provided in order to more completely explain the present invention to one skilled in the art.

[0015] Referring to Figure 1, a sender 10 using, for example, the sender's mobile handset 20 accesses the messaging system 35 of the present invention. In this embodiment, the sender 10 uses a mobile handset 20 but this should not be construed as a limitation. The sender 10 may, for example, also gain access to the messaging system 35 using other terminals such as a personal computer or a fixed telephone.

[0016] Once the sender 10 gains access to the messaging system 35 of the present invention, the sender 10 can choose to use an already created ringing tone that is stored within the MMS multimedia messaging server 50 or choose to edit his own using the ringing tone editing server 30. As previously stated, the sender 10 can also import a ringing tone from a source exterior to the messaging system 35 such as from an Internet site. Within such Internet sites, there typically exists a

tick box that asks the sender 10 whether the sender 10 would like the ringing tone sent as an SMS to the message indicating system. The sender 10 simply enters a known virtual telephone number for the server 40 and the Internet site sends the selected ringing tone to the server 40. The server 40 then forwards the selected ringing tone to the sender's handset. Once the ringing tone is sent to the sender's handset, the sender 10 is free to use the selected ringing tone.

[0017] The ringing tone editing server 30 allows a sender 10 to edit his chosen ringing tone note-by-note. However, the ringing tone editing server 30 is not limited to note-by-note editing. The ringing tone editing server 30 uses, for example, automatic voice assistance to guide the sender through the editing procedure.

[0018] The ringing tone editing server 30 is based on the seven basic notes in music. These notes are given names of alphabet letters from A to G which correspond to different pitches. Also there are additional notes between the letters called sharps and flats. These notes are represented by putting a sign behind the alphabetic letter. For example a B-sharp is symbolized as "B#". The ringing tone editing server 30 enables a sender 10 to add to a letter one of two possible signs: # for sharp notes and ^ for flat notes. Accordingly, writing music using the ringing tone editing server 30 is similar to writing text in that a sender 10 simply writes the letters (and signs if needed) which correspond to the pitch of the notes that the sender 10 would like to be played.

[0019] Once the sender 10 has chosen his personalized ringing tone, the sender 10 can then create his message. The sender 10 can create either a regular SMS message using the SMS server 40 or the sender 10 can create a multimedia message using the MMS multimedia messaging server 50. The sender 10 is not limited to creating his message using either the SMS server 40 or the MMS multimedia messaging server 50. For example, the sender 10 may also create his message using any type of application exterior to the messaging system 35 and import it into the messaging system 35 to be sent with the ringing tone. For example, the sender 10 can create a message using PC and an Internet application, as provided by many wireless service providers.

[0020] When the message is created and the ringing tone is chosen, the message is then sent to the recipient handset 60. The present invention then has the chosen ringing tone played automatically at the recipient's handset 60 when the message arrives at the recipient's handset 60. In a conventional cellular telephone, there is a special signaling channel between the telecom switch 70 and the handset (see OTA, "Over the Air" described in detail in GSM standard 11.14 of the 3GPP-3G Partnership Project at the European Telecommunication Standards Institute 650, route des Lucioles, 06921 Sophia Antipolis, France, Telephone No. +33 4 92 94 42 00, Fax +33 4 93 65 47 16, secretariat@etsi.fr (incorporated herein by reference)).

[0021] The command to activate the ring indicating the arrival of the sender's message, comes from the switch 70 to the handset by using the signaling channel. The receiver's ringing tone is stored in the telephone's memory, and when the telephone receives the command to activate the stored ringing tone, the receiver's telephone rings with the activated ring tone. However, in the present invention, the ringing tone editing server 30 asks the switch 70 to send an OTA (Over the Air) command. The OTA command instructs the recipient's handset 60 to play the ringing tone that has been sent with the message.

[0022] Although in the preferred embodiment the recipient handset 60 is a cellular telephone, other terminals may be used. For example, the recipient handset 60 may be any type of message receiving apparatus that possesses a SIM card such as GSM "powered" PDAs and cellular communication ports.

[0023] Referring to Figures 2(a) and 2(b), the process of a preferred embodiment of the present invention is discussed although this process should not be considered as limiting the present invention. A sender 10 enters the messaging system 35 of the present invention wishing to send a message with a personalized indicator at operation 1010. Upon entering the messaging system 35 of the present invention, the sender 10 is given the option of choosing an already created ringing tone or editing a new ringing tone at operation 1020. If the sender 10 chooses to use an already created ringing tone, then the sender 10 chooses a ringing tone from the ringing tones stored within the MMS multimedia messaging server at operation 1040. However, if the sender 10 chooses to create a new ringing tone, then the sender 10 creates the new ringing tone using the editing server at operation 1030.

[0024] After deciding on a personalized ringing tone, the sender 10 then creates his message at operation 1050. The sender 10 can create his message as an SMS message using either an SMS server 40 or the sender 10 can create a multimedia message using a MMS multimedia messaging server 50. The message is then sent to the recipient handset at operation 1060.

[0025] The message is subsequently received by the recipient handset 60. Upon arrival of the sender's message, the sender's personalized ringing tone is automatically played on the recipient's handset. This may indicate to the recipient that a message from the particular sender 10 has arrived at operation 1070. Regardless of the settings of the recipient's handset, the recipient's handset will play the personalized ringing tone of the sender (sender) 10. As stated above, the message has a command code within it that takes control of the recipient's handset 60 when the message arrives and plays the ringing tone. The command code within the message instructs the recipient's handset 60 not to ring the usual tone that notifies the message has arrived. Specifically, when a message arrives at the recipient's handset, the message and ringing tone are saved on a SIM

card in the recipient's telephone. Modern GSM telephones from at least the Second Generation have advanced SIM cards. These SIM cards include an application enabling software which is called SIM toolkit application. This software and the SIM card is defined by the GSM association in GSM standard 11.14, which is incorporated herein by reference. The present invention may be practiced using this standard although it is not limited thereto. The command code, written according to standard 11.14, sent with the message and ringing tone instructs the proactive SIM toolkit application (within the recipient's telephone) to request control from the CPU of the recipient's telephone. In this way, the incoming message takes control over the recipient telephone's message indicators, ring tones, display...etc. Therefore, the sent ringing tone can be played instead of the recipient's usual ringing tone to indicate the arrival of the sender's 10 message.

[0026] Part of the message is the ringing tone. The rest of the message will be played only if the recipient chooses to play the message. Thus, only the ringing tone will be played automatically. Once the recipient receives the message, the recipient can play the sender's message at operation 1080.

[0027] The recipient may not know who the message is from the first time the sender's ringing tone is played. After the recipient learns what ringing tone the sender 10 has chosen, he will be able to easily recognize who the message is from simply by the ringing tone. For example, if Mary sends a ringing tone that plays "Mary Had a Little Lamb", the recipient may not know who the message is from the first time the recipient's handset 60 played "Mary Had a Little Lamb" (unless, for example, Mary told the recipient what her ringing tone was prior to sending the message). However, the next time the recipient's handset 60 played "Mary Had a Little Lamb", the recipient would know that a message had arrived from Mary.

[0028] Although the above described a preferred embodiment, other embodiments are also available. For example, in another embodiment of the present invention, the sender 10 chooses a ringing tone from a source exterior to the messaging system 35. The sender 10 may also edit a ringing tone using an editing application that is also exterior to the messaging system 35. Along those same lines, a sender 10 may also acquire/download a ringing tone from the MMS multimedia messaging server 50 and use an editing application that is exterior to the messaging system 35. Another example may be adapting the present application to automatically use the indicating ringing tone on the recipient's personal computer or fixed telephone.

[0029] Additionally, the present invention can be adapted to eliminate the need for the ringing tone editing server 30 and/or one of the MMS or SMS servers. For example, the present invention can be adapted to use only the SMS server and allow the sender to choose a ringing tone from one of many stored in the SMS server.

Claims

1. A message indicating system comprising:

a server operable to create a message and operable to store a plurality of different message indicating ringing tones,

wherein a message indicating ringing tone selected by a sender is played automatically by a receiving unit when a message created by the server arrives at the receiving unit.

2. The message indicating system of claim 1, wherein the server is an MMS multimedia messaging server; and

wherein the message created by the sender using the MMS multimedia server is a multimedia message.

3. The message indicating system of claim 1, wherein the server is an SMS messaging server; and

wherein the message created by the sender using the SMS messaging server is an SMS message.

4. The message indicating system of claim 1, wherein the server is operable to create and edit message indicating ringing tones.

5. The message indicating system of claim 4, wherein the sender creates the message indicating ringing tone using a source exterior to the message indicating system.

6. The message indicating system of claim 4, wherein the message indicating ringing tone created by the sender is downloaded via an Internet connection to the server.

7. A message indicating system comprising:

a messaging server operable to create a message;

a storage server operable to store a plurality of different message indicating ringing tones; and

wherein a message indicating ringing tone selected from the storage server by a sender is played automatically by a receiving unit when a message created by the sender using the messaging server arrives at the receiving unit.

8. The message indicating system of claim 7, wherein the messaging server is an MMS multimedia messaging server; and

wherein the message created by the sender using the MMS multimedia messaging server is a

multimedia message.

9. The message indicating system of claim 7, wherein the messaging server is an SMS messaging server; and

wherein the message created by the sender using the SMS messaging server is an SMS message.

10. The message indicating system of claim 7, wherein the storage server is operable to create and edit message indicating ringing tones.

11. The message indicating system of claim 1, 2, 3, 4, 8, 9 or 10, wherein the sender accesses the message indicating system using a cellular telephone.

12. The message indicating system of claim 1, 2, 3, 4, 8, 9 or 10, wherein the sender accesses the message indicating system using a personal computer.

13. The message indicating system of claim 1, 2, 3, 4, 8, 9 or 10, wherein the sender accesses the message indicating system using a fixed telephone line device.

14. A method of indicating arrival of a message comprising: providing a message indicating ringing tone by a sender; and ringing receiving unit with the message indicating ringing tone provided by the sender.

15. The method of indicating arrival of a message of claim 14, further comprising:

creating a message;
sending the message and the message indicating ringing tone to the receiving unit; and
using the message indicating ringing tone provided by the sender instead of a ringing tone stored in the receiving unit.

16. The method of indicating arrival of a message of claim 15, wherein the message created is an SMS message.

17. The method of indicating arrival of a message of claim 15, wherein the message created is a multimedia message.

18. The method of indicating arrival of a message of claim 15, wherein the message indicating tone is chosen from a plurality of different message indicating tones.

19. The method of indicating arrival of a message of claim 15, wherein the message indicating tone is created by the sender.

20. The method of indicating arrival of a message of claim 15, wherein the message indicating tone is created using the sender unit's keypad.
21. The method of indicating arrival of a message of claim 15, wherein the message indicating tone is created using an Internet site.
22. A message indicating system comprising:
 a server operable to create a message containing a sender-selected ring tone,
 wherein the sender-selected ring tone is played automatically by a receiving unit when the message created by the server arrives at the receiving unit.
23. The message indicating system of claim 22, wherein said server is operable to create ring tones.
24. The message indicating system of claim 22, wherein said server allows a sender chose among a plurality of stored ring tones.
25. The messaging indicating system of claim 23, wherein said server allows a sender to create ring tone on a note by note basis.
26. A method of creating a message indicating a ringing tone comprising:
 accessing a server operable to create messages;
 creating a message by a sender;
 selecting a ringing tone by the sender from said server; and
 combining said ringing tone with said message by said server,
 wherein said ringing tone becomes a header of said message.
27. The method of claim 26, wherein said ringing tone comprises a string of alphabetic letters, wherein each alphabetic letter represents a specific musical tone.
28. The method of claim 27, wherein the message is a voice message of the sender recorded by the server.
29. The method of claim 26, wherein the server is an MMS multimedia server.
30. A method of creating a message including a ringing tone comprising:
 accessing a server operable to create messages;
 creating a message by a sender;
 creating a ringing tone by the sender using said server; and
 combining said ringing tone with said message by said server,
 wherein said ringing tone becomes a header of said message.
31. The method of claim 33, wherein said ringing tone comprises a string of alphabetic letters, wherein each alphabetic letter represents a specific musical tone.
32. The method of claim 31, wherein the sender creates the ringing tone by selecting a series of alphabetic letters.
33. The method of claim 32, wherein the sender accesses the server using a cellular telephone and selects the series of alphabetic letters using a keypad of the cellular telephone.
34. The method of claim 30, wherein the sender accesses the server using a cellular telephone.
35. A method of receiving a message-indicating ringing tone message by a receiving unit comprising:
 receiving an over-the-air command from a telecom switch;
 receiving a message which includes a message-indicating ringing tone; and
 using the message-indicating ringing tone instead of a ringing tone stored in the receiving unit to indicate arrival of the message;
 wherein said over-the-air command causes the receiving unit to use the message-indicating ringing tone.
36. The method of claim 35, wherein the receiving unit is a cellular telephone.
37. The method of claim 35, wherein the receiving unit includes a SIM card that supports SIM toolkit.
38. The method of claim 35, wherein said message-indicating ringing tone comprises a string of alphabetic letters, wherein each alphabetic letter represents a specific musical tone.
39. A message indicating system comprising:
 an MMS multimedia messaging server operable to create MMS messages;

an SMS server operable to create SMS messages;
 a telephone switch operable to send over-the-air commands to cellular telephones; and
 a ringing tone editing server operable to create new ringing tones and store a plurality of ringing tones,

wherein the ringing tone editing server is interconnected to said MMS multimedia messaging server and said SMS server,

wherein messages created by said MMS multimedia messaging server or said SMS server are combined with a ringing tone selected or created by a sender into a message-indicating message and sent to a receiver's cellular telephone,

wherein said telecom switch sends an over-the-air command to the receiver's cellular telephone, said over-the-air-command causes the receiver's cellular telephone to play the ringing tone of the message-indicating message instead of a different ringing tone stored in the receiver's cellular telephone.

40. A method of creating a message including a ringing tone comprising:

...
 accessing a server operable to create messages;
 creating a ringing tone by a sender using said server;
 creating a message by the sender; and
 combining said ringing tone with said message by said server, wherein said ringing tone becomes a header of said message.

41. The method of claim 40, wherein said ringing tone comprises a string of alphabetic letters, wherein each alphabetic letter represents a specific musical tone.

42. The method of claim 41, wherein the sender creates the ringing tone by selecting a series of alphabetic letters.

43. The method of claim 42, wherein the sender accesses the server using a cellular telephone and selects the series of alphabetic letters using a keypad of the cellular telephone.

44. The method of claim 30, wherein the sender accesses the server using a cellular telephone.

45. A method of creating a message including a ringing tone comprising:

accessing a server operable to create messages;

selecting a ringing tone by a sender from said server;
 creating a message by the sender; and
 combining said ringing tone with said message by said server, wherein said ringing tone becomes a header of said message.

46. the method of claim 45, wherein said ringing tone comprises a string of alphabetic letters, wherein each alphabetic letter represents a specific musical tone.

47. The method of claim 46, wherein the message is a voice message of the sender recorded by the server.

48. The method of claim 47, wherein the server is an MMS multimedia server.

Figure 1

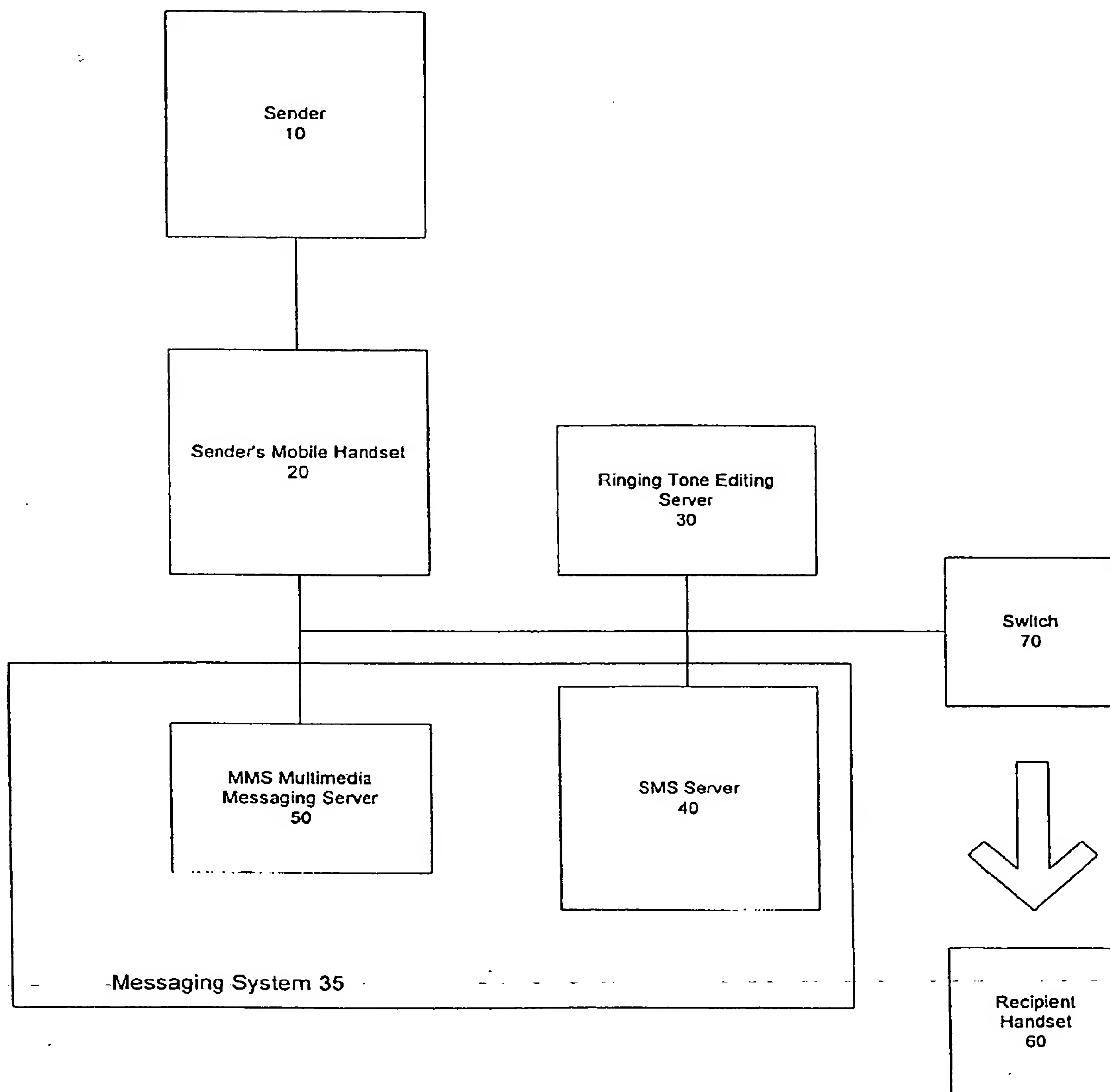


Figure 2(a)

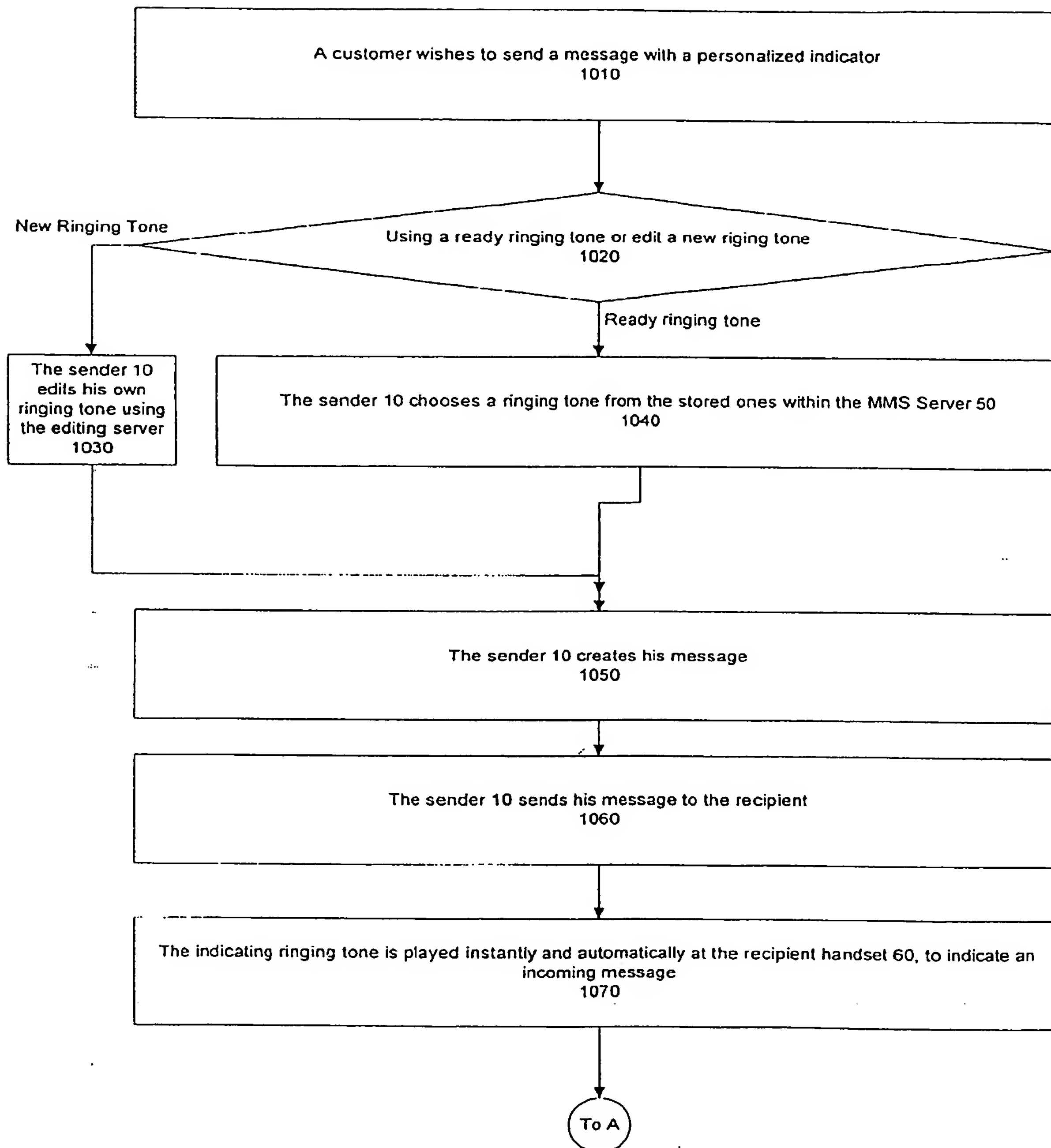
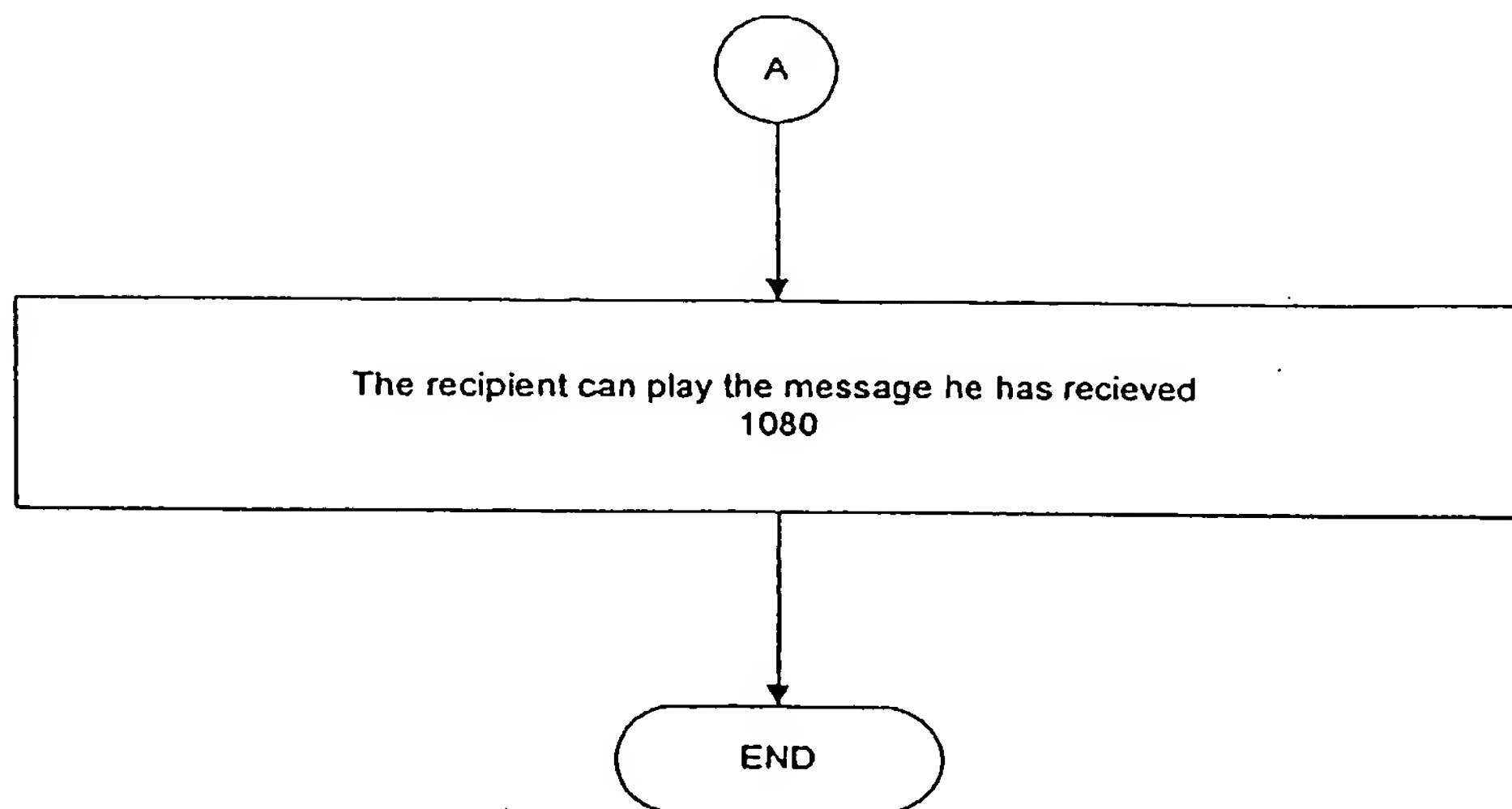


Figure 2(b)





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EUROPEAN SEARCH REPORT

Application Number
EP 02 07 7903

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
P,X	EP 1 117 245 A (NOKIA CORP) 18 July 2001 (2001-07-18) * abstract * * column 1, line 14 - line 42 * * column 2, line 19 - line 32 * * column 2, line 53 - column 3, line 11 * * column 3, line 25 - line 37 * ---	1,14,22	H04M19/04
A	WO 01 28221 A (MARTIN PETER ;SIEMENS AG (DE)) 19 April 2001 (2001-04-19) * page 3, line 36 - page 5, line 26 * ---	1-48	
A	EP 0 851 649 A (NOKIA MOBILE PHONES LTD) 1 July 1998 (1998-07-01) * page 4, line 30 - page 5, line 55 * ---	1-48	
A	WO 00 36857 A (RADIOLINJA AB OY) 22 June 2000 (2000-06-22) * the whole document * -----	1-48	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.7) H04M
Place of search THE HAGUE		Date of completion of the search 27 September 2002	Examiner Sorrentino, A
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 02 07 7903

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27-09-2002

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 1117245 A	18-07-2001	EP 1117245 A1	18-07-2001
		JP 2001217907 A	10-08-2001
WO 0128221 A	19-04-2001	WO 0128221 A1	19-04-2001
		EP 1221254 A1	10-07-2002
EP 0851649 A	01-07-1998	FI 965265 A	01-07-1998
		EP 0851649 A2	01-07-1998
		JP 10215321 A	11-08-1998
		US 6094587 A	25-07-2000
WO 0036857 A	22-06-2000	FI 982714 A	16-06-2000
		EE 200100312 A	15-08-2002
		EP 1142364 A2	10-10-2001
		WO 0036857 A2	22-06-2000

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